

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently amended): A method of ligating a double-stranded end of a first double-stranded DNA and a single-stranded end of ~~another~~ second double-stranded DNA, wherein the method comprises:

- a) contacting, in the presence of a homologous ~~recombinant~~ recombination protein, the single-stranded end of said ~~other~~ second double-stranded DNA and the double-stranded end of said first double-stranded DNA, wherein said first double-stranded ~~DNA~~ end comprises a sequence that is homologous to the nucleotide sequence of said single-stranded end, to form a three-stranded structure comprising said single-stranded end and said double-stranded end, and
- b) completing the ligation by converting the three-stranded structure into a double-stranded structure by inserting ~~the~~ a DNA complex comprising the three-stranded structure into cells and replicating it therein;

wherein the homologous recombination protein is the Rec A protein.

Claim 2 (Currently amended): The method of ligation of claim 1, wherein said DNA complex is a circular DNA complex having a three-stranded structure in two positions, wherein said three-stranded ~~structure is~~ structures are made by either the ligation of:

- a) a double-stranded DNA comprising a single-stranded region at both ends,
and
- b) a double-stranded DNA having at both ends a double-stranded region
comprising sequences that are respectively homologous to ~~said~~ each single-
stranded nucleotide ~~regions~~ region in a); or the ligation of:
- c) a double-stranded DNA comprising a single-stranded region at one end and a
double-stranded region at the other end, and
- d) a double-stranded DNA comprising a double-stranded region at one end
having a sequence that is homologous to the nucleotide sequence of said
single-stranded nucleotide region in c) and a single-stranded region at the
other end comprising a sequence that is homologous to the nucleotide
sequence of the double-stranded nucleotide region in c).

Claim 3 (Previously presented): The method of ligation of claim 2, wherein the nucleotide sequences of the two single-stranded regions in a) are mutually non-complementary.

Claim 4 (Previously presented): The method of ligation of claim 2, wherein the two single-stranded region ends in a) are within the same double-stranded DNA.

Claims 5-6 (Canceled).

Claim 7 (Previously presented): The method of ligation of claim 1, wherein the nucleotide sequence of the single-stranded region is at least a 6mer.

Claim 8 (Canceled).

Claim 9 (Currently amended): The method of claim 1, wherein the ~~contact~~ step of contacting in part (a) is done furthermore under the presence of nucleoside triphosphate or a derivative thereof.

Claims 10-11 (Canceled).

Claim 12 (Previously presented): The method of ligation of claim 1, wherein the insertion of the DNA complex comprising a three-stranded structure into cells is done by electroporation.

Claim 13 (Previously presented): The method of ligation of claim 1, wherein the conversion of the three-stranded structure to a double-stranded structure is done by a nucleic acid modification enzyme.

Claims 14-20 (Canceled).

Claim 21 (Currently amended): A gene-cloning kit consisting essentially of the following components:

- a) a double-stranded DNA comprising single-stranded regions at both ends, wherein the nucleotide sequences of these single-stranded regions are mutually non-complementary, ~~wherein said DNA comprises a DNA sequence which confers to the double-stranded region of said DNA, the ability of auto-replicating within competent cells;~~
- b) an oligonucleotide primer comprising as a part of the 5' end sequence, a sequence that is complementary to one single-stranded region of the nucleotide sequence of (a), and is complementary to a part of one end of a sequence of a gene to be cloned;
- c) an oligonucleotide primer comprising as a part of the 5' end sequence, a sequence that is complementary to the other single-stranded region of the nucleotide sequence of (a), and is complementary to a part of the other end of the sequence of the gene to be cloned; and

- d) a homologous ~~recombinant~~ recombination protein;
wherein the homologous recombination protein is the Rec A protein.

Claim 22 (Previously presented): The kit of claim 21, wherein the nucleotide sequence of each single-stranded region is at least 6mer.

Claim 23 (Previously presented): The method of ligation of claim 1, wherein steps a) and b) take place in the absence of DNA ligase.

Claim 24 (Previously presented): The method of ligation of claim 1, wherein the double-stranded structure resulting from step b) has no gaps.